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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,568

03/27/2006

Akihiko Kubota

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03/31/2011

WENDEROTH, LIND & PONACK L.L.P.

1030 15th Street, N.W.

Suite 400 East

Washington, DC 20005-1503

EXAMINER

STIMPERT, PHILIP EARL

ART UNIT

PAPER NUMBER

3746

NOTIFICATION DATE

DELIVERY MODE

03/31/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ddalecki@wenderoth.com

coa@wenderoth.com

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/573,568	KUBOTA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Philip Stimpert	3746	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 January 2011.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 5 and 7-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5 and 7-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 December 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **FINAL REJECTION**

### **Status of the Claims**

1. The Examiner acknowledges receipt of Applicant's amendments, arguments and remarks filed with the Office on 18 January 2011 in response to Non-Final Office Action mailed by the Office on 15 October 2010. Per Applicant's response, Claim 5, 10 and 11 have been amended, while Claims 12 and 13 have been newly-added. Claims 1-4 and 6 are cancelled. All other claims remain in their previously presented form. Therefore, Claims 5 and 7-13 are pending in the instant application. The Examiner has carefully considered all of Applicant's arguments and remarks, and they will be addressed below.

### **Title**

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --Reciprocating Compressor Having A Balancing Mechanism--.

### **Claim Rejections - 35 USC § 112**

3. Claims 12 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

4. Claims 12 and 13 present negative limitations, i.e. "only said eccentric section, said piston, said connecting rod, and said balancing weight" (claim 12) and "only at said eccentric

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section axis" (claim 13). These limitations are not supported in the disclosure as originally filed.

The examiner notes that a lack of disclosed alternatives does not provide the necessary positive support for excluding other arrangements.

### **Claim Rejections - 35 USC § 103**

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima et al. (US 5,816,783) in view of Fujikawa et al. (US 4,628,876) and as extrinsically evidenced by Glinsner (US PGPub 2004/0211384).

7. Regarding claim 5, Oshima et al. teach a reciprocating compressor (see Fig. 2) comprising a hermetic container (10), a compressing element (12) accommodated in the hermetic container and compressing refrigerant gas (see abstract), the compressing element including a crankshaft (1) with a main shaft (1) and an eccentric section (1a) having respective axes, a block (4) forming a cylindrical cylinder (4a), a piston (2) reciprocating in the cylinder, a connecting rod (2c) connecting the eccentric section to the piston, and a balancing weight (indicated at 1, in Fig. 6A) which would balance vibrations produced by the piston and connecting rod. Oshima et al. also teach that the cylinder (4) is offset (see E in Fig. 6A) such that an axis line of the cylinder and an axis line of the main shaft do not cross each other. Oshima et al. do not teach that the balancing weight is deviated from a position exactly opposite the eccentric section axis. Fujikawa et al. teach (see Fig. 7) an engine balancing system for a single cylinder engine with an

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offset between the axes of the drive shaft and cylinder (Fig. 7). Fujikawa et al. teach that this system includes a primary balancing weight and a counterbalancing weight having a center of gravity ( $C_1$ ) that deviates a suitable distance from diametrically opposite the crank pin (15, see col. 4, ln. 48-62). Fujikawa et al. teach that this arrangement "is capable of lowering the vibromotive force acting in the direction of the center line of the cylinder to the same level as that prevailing in the engine" (col. 5, ln. 29-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the balancing system of Fujikawa et al. for that of Oshima et al., in order to reduce the vibromotive forces thereof. Further, Fujikawa et al. shows the piston in essentially top dead center position, and shows that the center of gravity of the balancing weight ( $C_1$ ) is offset from the cylinder axis but not beyond a plane (perpendicular to the page) that includes the main shaft axis ( $O_1$ ) and is parallel with the cylinder axis. Neither Oshima et al. nor Fujikawa et al. teach that the center of gravity of the counterbalancing weight trails the eccentric shaft by less than  $180^\circ$ . However, Glinsner teaches a combustion engine (see Fig. 1) having a piston (50), connecting rod (80), eccentric shaft section (20), and counterweight (120). Glinsner also teaches that the angular positions, masses and center of gravity of all of these elements may be optimized through routine experimentation or calculation in order to minimize vibrations in the engine (see paragraph 32), i.e. to minimize vibrations in the installation as a whole. Therefore, the claimed position of the center of gravity is an obvious matter of design optimization to be expected of one of ordinary skill in the art, which fails to patentably distinguish over the teachings of Oshima et al. and Fujikawa et al.

8. Regarding claim 9, Oshima et al. teach that the crankshaft is generally vertical (Fig. 2).

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9. Regarding claim 10, Fujikawa et al. teach that the center of gravity of the balancing weight, the eccentric section axis, and the main shaft axis are not displaceable with respect to each other.

10. Regarding claim 11, Fujikawa et al. teach that balancing weight is provided such that the crankshaft and piston of Oshima et al. and the balancing weight ( $C_1$ ) are arranged such that throughout reciprocation of the piston the eccentric axis (15), location opposite the eccentric axis ( $B_1$ ) and counter weight center of gravity are arranged in that order (see Fig. 7, and direction of rotation  $A_1$ ).

11. Regarding claim 12, Oshima et al. teach that the main shaft (1) has only an eccentric section (1a), piston (2), connecting rod (3), and counterweight (see Fig. 1) connected thereto. The teachings of Fujikawa et al. and Glinsner merely optimize the location of these elements, therefore the limitations of the claim are met by the combination.

12. Regarding claim 13, Oshima teaches that the eccentric rotary connection to the main shaft (1) is only provided at the eccentric section axis (1a).

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima et al. in view of Fujikawa et al., Glinsner, and in further view of Musso et al. (US 6,695,973).

14. Oshima et al. and Fujikawa et al. substantially teach the limitations of claim 1 from which claim 3 depends, as discussed above. Oshima et al. do not teach the use of R600a as a refrigerant. Musso et al. teach several refrigerant gases, including R600a (or isobutane, see entries E and F in the table in col. 3). Musso et al. also teach that “isobutene is usually a commercial product which can contain up to 10% of n-butane,” (col. 3, ln. 33-34) and that the

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use of such materials results in the advantageous reduction of wear in a compressor (col 4, ln. 9-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use R600a as a refrigerant in the compressor of Oshima et al. in order to reduce wear in the compressor.

15. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oshima et al. in view of Fujikawa et al., Glinsner, and in further view of Hayasha et al. (US 5,506,486).

16. Oshima et al. and Fujikawa et al. substantially teach the limitations of claim 1 from which claim 4 depends, as discussed above. Oshima et al. also teach that the compressor is driven by an electric motor (see abstract). Oshima et al. do not teach that the crankshaft is driven by an inverter operating at a frequency not greater than a commercial power frequency. Hayasha et al. teach a control apparatus for a compressor, and in particular teach an inverter (see abstract) used to drive a shaft (220). Hayasha et al. also teach a range of frequencies (Fig. 3) output by the inverter. One of ordinary skill would appreciate that these frequencies are below the supply frequency (usually 60 Hz in America, see col. 10, ln. 35 for example showing cognizance of that fact by Hayasha et al.). Finally, Hayasha et al. teach that optimum efficiencies are obtained by the motor at such frequencies (col. 4, ln. 11-29). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an inverter to drive the shaft of Oshima et al. at a frequency lower than the commercial power frequency as taught by Hayasha et al., in order to obtain optimum compressor efficiencies.

### **Response to Arguments**

17. Applicant's arguments filed 18 January 2011 have been fully considered but they are not persuasive.

18. With respect to the argument (see pages 5-6 of applicants Remarks) that Glinsner balances vibrations caused by a counterweight, this is not germane to the rejection of claim 5. The recitation of the vibratory components in the claim is open-ended, and does not exclude taking other elements into consideration.

19. With respect to the argument (page 6 of applicants Remarks) that Glinsner teaches a different type of balancing system than that of claim 5, this is not persuasive. The particular type of balancing system is taught by Oshima et al. and Fujikawa et al. Glinsner merely provides evidence that one of ordinary skill in the art could be expected to optimize the angular location of the center of gravity of a counterweight in a vibration reducing system. As such, any particular location of such a center of gravity is considered to represent merely the result of routine experimentation which fails to distinguish over a fundamentally similar system disclosed by the prior art.

### **Conclusion**

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period



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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### **Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William H. Rodríguez/  
Primary Examiner, Art Unit 3741

/P. S./  
Examiner, Art Unit 3746  
23 March 2011